A critical appraisal of "The Effects of Exercise Using PNF in Patients With a Supraspinatus Muscle Tear"

By

KASEY TUCKER, SPT

In partial fulfillment of the

requirements for the course:

PT 7240 Evidence-Based Practice in Physical Therapy

Department of Physical Therapy

Angelo State University

Member, Texas Tech University System

October 26, 2020

Abstract

The purpose of this critical appraisal is to examine the credibility and reliability of a study conducted by physical therapists examining the effectiveness of PNF techniques compared to simple exercises for a supraspinatus muscle tear. The introduction of the article emphasizes the importance of why the study was conducted but lacks background information on PNF treatment. Additionally, the methods section does not include the exact exercises used, which would create difficulty in replicating the study. However, the results section is well written and clearly presents that PNF techniques were found to increase the speed of blood flow to the supraspinatus and improve muscle function more than simple exercises. Despite the limitations and weaknesses found in the article, this study presents the potential of PNF techniques in the rehabilitation of a supraspinatus muscle tear. However, I would not recommend this article to physical therapists, as there needs to be further research conducted to prove the effectiveness of PNF training as an intervention.

Key words

PNF training, supraspinatus, shoulder

Introduction

Rehabilitating the shoulder can be complicated and grueling, as it is one of the most complex joints in the body. As a physical therapist, effectively treating the shoulder is crucial in rehabilitating the patient back to being independent. The article that is being critically appraised examines the effects proprioceptive neuromuscular facilitation (PNF) techniques have on supraspinatus muscle tears compared to simple exercises. Research plays a vital role in effective physical therapy treatment. Therefore, it is important as a clinician to utilize literature that has been critically appraised and has been found to be reliable and valid. The clinical question that is being presented for this appraisal is as follows: is PNF training an effective intervention for a patient who has scapular dyskinesis compared to resistance training?

Methods

To begin my critical appraisal, I used the PubMed Central database. Keywords used in my search included scapular winging, shoulder instability, PNF, and shoulder PNF. I limited my results to full text articles only as this would lessen the amount of results to articles I would have full access to. Additionally, I limited my search results to articles that have been published within the last ten years. I found this limitation to be the most critical because treatments of physical therapy are always changing and I wanted to have the most recent interventions. However, even with these limitations I had over 5,000 hits found. Therefore, the criteria I used to look for articles was based off of interventions and population. My clinical question emphasizes PNF or resistance training so I excluded any results that were about other interventions, like

manual therapy. Additionally, I excluded any article that did not address any type of shoulder injury or scapular dyskinesis.

After analyzing my search results, I chose an article from the Journal of Physical Therapy Science. The article was published in 2015 and conducted in the Republic of Korea. Authors Jwa-Jun Kim, MS, PT, Sang-Yeol Lee, MS, PT, and Kyungjin Ha, MS, PT conducted a study to look at the results of utilizing PNF techniques compared to simple exercises in patients with a diagnosed supraspinatus muscle tear. I reviewed two other articles but chose this one for a few different reasons. All the authors of this article are licensed physical therapists who work at different universities in the Republic of Korea. Additionally, this study specifically compared PNF techniques to simple exercises for the same diagnosis. I believe this adds to the reliability of this study and lessens the chance of error or limitations in the results.

Results

Summary of the study

As one of the muscles that makes up the rotator cuff of the shoulder, the supraspinatus is commonly torn. This type of injury has a high reoccurrence rate, therefore there is much interest about functional disability. The authors present their study as an opportunity to compare PNF training with simple exercises in rehabilitation of a supraspinatus tear. To do this, researchers focused on observing the speed of blood flow to the injured muscle, the subjective level of pain from the patient, and the functional ability of the shoulder. There were 20 subjects who all had been diagnosed with a muscle tear by MRI. The subjects went through rehabilitation for 12 weeks that included PNF training or simple exercises. After 12 weeks, researchers determined

that there was no significant difference, in regard to speed of blood flow or level of pain, between PNF training and simple exercises. The researchers of this study found that the speed of blood flow in the supraspinatus increased an average of 71% in the group of subjects who used PNF training. However, simple exercises showed much more decrease in pain.

Appraisal of the study introduction

One of the reasons I chose this study was because of the way the authors introduced the importance of rehabilitation of the shoulder. Stating how common supraspinatus tears are and how grueling the rehabilitation process can be show the urgency of conducting a study like this. Additionally, the authors present the purpose of this study in a clear and precise way.

Although I found the introduction of the article to be comprehensive and informative of the background information, there were a few weaknesses. There was a lack of information on PNF training specifically and what it entails. I believe this is important information to add because the authors state how there is a lack of research done on PNF training in this specific area. Another weakness I found was in one of the listed key words, DASH. DASH was never mentioned in the introduction. I do not find this to be a significant weakness, however, it could hinder others in their searches.

Appraisal of the study methods

The study conducted is an experimental, prospective study and has a cross-sectional duration. The statistical analysis used was ANOVA, which is common and credible. There are many strengths in the methods of this study. The experiment was kept consistent and the only difference between the two groups of subjects was the experimental interventions that were

being studied. The subjects completed 12 weeks of rehabilitation, which is an appropriate amount of time to see potential changes occur. All subjects went through the same length and frequency of rehabilitation. The subjects all warmed up for 10 minutes in the same way and were tested on the same day of the week. The methods of this study were consistent and credible, and I believe it adds significant evidence to the question I am presenting.

The methods section had a few weaknesses. One of those weaknesses was the lack of information on whether or not the study was single or double blinded. Because there was no mention of anyone being blinded, it leads me to believe that there was no concealment of information. Although this article clearly describes the interventions used, the authors do not go into specific detail to which simple exercises or aspects of PNF training were actually used. Additionally, the authors stated which instruments and outcome measures were used but did not include any support to back up the reliability or validity of these tools. These weaknesses would make it challenging to replicate this study.

Appraisal of the study results

The authors present the results in an organized and clear manner. Even with a lot of data to present, the authors lay it out in a simple way to follow. The results are listed in the same order as the procedures were presented in the methods section, and they clearly address the aim of the study which was to look at how PNF training and simple exercises impact the speed of blood flow in the supraspinatus and change in pain subjectively. All of the results presented were followed with p-values explaining their significance.

While appraising the results, a significant weakness was found in the opening sentence of this section. To introduce the data collected, the authors address observing the subjects for

changes in speed of blood flow, pain level, and DASH score. A typo was found in this sentence, most likely due to translation errors, which created confusion. Another weakness found was the lack of a parameter of confidence intervals. Lastly, the authors did not mention any concept about minimal clinically important difference (MCID) or the number needed to treat (NNT).

Appraisal of the study discussion

The authors further explained the meaning of their findings in the discussion section. Instead of just repeating their results, they went into further explanation and presented the differences between the two groups in percentages. Additionally, the authors related their findings from this study to the existing literature referenced, which are from primary sources of credible journals. Limitations of this study were clearly presented in this section, including use of MRI and echography for diagnosis, and subjects who had never had a supraspinatus injury before for any future studies and research.

Even though the literature referenced by the authors of this study is from primary sources of credible journals, the majority is more than 20 years old. This questions the credibility and reliability of these sources because of how innovative this field is with research. Also, the authors do not specifically address the clinical significance or application of the study. The importance of the treatment for this injury is emphasized in the introduction, but I believe it should be readdressed in the discussion. As mentioned before in the appraisal of the results section, the authors also contradict themselves in the discussion. The data they present does not match up with their explanations that follow. This is very confusing for the reader and is a cause for concern on the validity of the results.

Discussion

My clinical question presents potential discussion on how effective PNF training is when treating scapular dyskinesis. The shoulder is a complex joint and the rehabilitation may need to not only address the actual muscle tear, but also the scapula itself. This study can be useful to physical therapists and their treatment for patients with a shoulder injury because it shows an increase in speed of blood flow to a muscle that acts on the scapula from the use of PNF training. Although the study I have chosen may not look directly at scapular dyskinesis, it does assess the effectiveness of PNF training versus simple exercises in shoulder rehabilitation. As mentioned before, the shoulder joint is very complex. If one aspect, like a muscle of the rotator cuff, is injured the chance of abnormalities in other aspects, for example the scapula, is increased.

I believe there is significant potential for PNF techniques to be one of the more effective and common interventions used to treat a shoulder injury. A physical therapist's job is to help patients get back to their prior injury level of function. PNF training for shoulder rehabilitation proves to offer more effective recovery in the terms of muscle function. It's also been shown to increase the speed of blood flow in the muscle, which furthers and betters the recovery of the injury. However, potential risks or disadvantages using this intervention may be the length of rehabilitation. From my own personal experience, it is hard to retrain a muscle and its movement pattern, which is essentially what PNF is doing. This may lengthen the time of rehabilitation and it also runs the risk of patients getting tired and dropping out. Another potential risk is that it has been proven that PNF training does not cause a decrease in pain level when compared to simple exercises. However, I believe that the potential benefits outweigh the potential risks. We must get patients back to an ideal level of muscle function in order for them to be independent

community members. Our job is to not only address the patient's pain, but also the level of function they present. With more research, specifically comparing PNF training to other forms of therapy interventions and involving other shoulder musculature, the argument could be improved in favor of using PNF in physical therapy for a shoulder injury.

In treating my future patient, I would need more articles on other studies conducted in regard to using PNF techniques in my treatment plan. I believe that PNF can be very effective, but I would want to have more research to support my belief. However, I can definitely anticipate implementing this specific intervention safely and appropriately. PNF training has been used as a component of treatment plans before and has been shown to be effective.

In conclusion, I believe PNF training could potentially be more effective than resistance training when treating scapular dyskinesis. This study did not specifically examine scapular dyskinesis, however, it is clinically relevant to the clinical question I have presented. After critically appraising this article, I believe there needs to be more research conducted comparing PNF training to different therapy interventions while treating the shoulder. Based off of the data provided, I believe this article provides evidence of potential effectiveness of PNF training. However, because of inconsistencies in the results, I would not use this article as support for implementing PNF treatment into my own clinical practice.